

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Patent Application No. 10/700,547

REMARKS

Reconsideration and allowance of the subject application are respectfully requested. By this Amendment, Applicant has added new claims 13-26. Thus, claims 1-26 are now pending in the application. In response to the Office Action, Applicant respectfully submits that the pending claims define patentable subject matter.

Claims 9-11 are objected to because the Examiner maintains the claims contain grammatical informalities. By this Amendment, Applicant has amended the claims to improve clarity. Accordingly, the Examiner is requested to remove the objection to the claims.

Claims 1-12 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Shinohara (JP 5-214843) in view of Toschi (EP 819 661). Applicant respectfully traverses the prior art rejection.

Amended independent claim 1 is directed to “[a] method for preventing or reducing vibration around a structure which generates vibration or receives vibration.” Claim 1 requires “disposing a plurality of adjoining column members and an elastic member underground directly underneath or around said structure, said column members forming a hard layer-contiguous with said elastic member, wherein said column members have a greater stiffness than the surrounding ground.”

With regard to claim 1, the Examiner asserts that Shinohara discloses all of the features of the claimed invention including a hard member/layer (plate member 4) and an elastic member (shock absorbing material 3). Although the Examiner states that Shinohara fails to specifically disclose that the shock absorbing material 3 is rubber in the abstract (i.e., the Examiner

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apparently did not obtain a full translation of Shinohara) and cites Toschi for allegedly disclosing the use of tire chips in damping structures.

However, Applicant respectfully submits that the cited references, alone or combined, do not teach or suggest a hard layer formed by a plurality of adjoining column members having a stiffness greater than the surrounding ground, as required by independent claim 1.

As shown in Fig. 1, Shinohara discloses a ground vibration reducer 2 which is mounted into space formed between the underground external wall 1A of a structure 1 and the ground G. The ground vibration reducer 2 includes shock absorbing material (cushioning) material 3 contacting the underground external wall 1A, and a shell-shaped plate member 4 interposed between the shock absorbing material and the ground G. The shock absorbing material 3 is formed of an anisotropic elastic body such as rubber or resin. The plate member 4 is formed of a rigid material such as steel or concrete. As shown in Fig. 4, the ground vibration reducer 2 may include a lamination of alternating layers of shock absorbing material 2B and plate members 2A. As shown in Fig. 6, a ground vibration reducer 10 is disposed around a foundation pile 9, wherein a plate member 4A is formed in the shape of a cylinder and shock absorbing material 3A is provided between the plate member 4A and the foundation pile 9 at two or more places.

Shinohara discloses that a set of isolators of laminated hard plate members with cushioning material is installed directly on vertical walls along the pile, which works mainly for reducing the shear force action on the building by the shear deformations at the isolators. In order to install the isolators, it is necessary for one end of the isolators to be fixed to the outside

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surrounding of the vertical wall. The horizontal deformation is very small as mentioned in the Shinohara, so that the horizontal vibration reduction is not considered to be targeted.

On the other hand, the present invention is based on a mechanism which is different in configuration and vibration reducing properties from the teachings of Shinohara. According to the present invention, the vibration energy reduction is performed in the process for modulating the incoming wavelengths into small wavelengths by aid of the column members forming a hard layer contiguous with the elastic member. Therefore, the vibration reducers can be constructed not only to surround the targeted structure that emits vibrations or suffers from incoming vibrations but also installed between them.

Except for the use of tire chips in damping structures as diaphragm walls or foundation, the present invention is also clearly different in construction and effect from the teaching of Toschi. In particular, Toschi makes use of the soft cushion effect for reducing the impact loading from outside. The present invention, on the other hand, makes use of the wave modulating effect to reduce the vibration energy in the installed zone of the claimed vibration reducer with the aid of cascaded impedance ratios for wave propagation/impediment between stiff and soft materials.

Accordingly, Applicant respectfully submits that independent claim 1, as well as dependent claims 2-12, should be allowable because the combined references do not teach or suggest all of the features of the claims.

Lastly, Applicant has added new dependent claim 13 and new system claims 14-26 in order to provide additional coverage for the claimed invention. With regard to claim 13,

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Applicant respectfully submits that the cited references do not teach or suggest "said elastic member and said hard layer formed by said column members form a basic unit, and a plurality of basic units are arranged in a contiguous manner underground directly underneath or around said structure." With regard to claims 14-26, Applicant respectfully submits that these claims should be allowable for the same reasons set forth above with regard to claims 1-13.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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